ESTABLISHMENT AND OPERATION OF A NATIONAL TECHNOLOGY TRANSFER CENTRE (The Case of Tanzania)

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ABSTRACT

Transfer of technology is a particularly significant factor in determining the future directions of the world at large. The important role of technology in development has gained wide recognition. Technology is the master key of development. It is necessary for creating a prosperous society even for the poorest of the poor. It is merely an instrument for problem solving and has enabled man to make his living surroundings more comfortable.

The capacity to produce technology is infinitely more important than technology itself. The prosperity of a nation depends not on the quantum of technologies it has amassed but on its capacity to generate technologies and use it.
A technology transfer centre should have a capacity of generating, coordinating and transferring of technologies; rather than the mere transfer of equipment from the industrialised to the developing countries.

The objective of the paper is to discuss in general important steps towards establishing a centre for technology transfer. The Centre for Development and Transfer of Technology (CDTT) established under Part IV of the Act No.7 of 1986 of the Tanzania Commission for Science and Technology (COSTECH) and officially began operating in 1st July 1994, is taken as a case study for a technological transfer centre.

Technology transfer involves acquiring, developing and using knowledge, and information that is very important in facilitating technology transfer.
The paper outlines in detail what should a centre accomplish. Any technology transfer centre should act as an interface between scientific community and private industry, converting the results of research into competitive products and processes.

In order for a technology transfer centre to be more effective and sustainable, it should also operate on a commercial basis by providing basic services and interdisciplinary exchange of information, research and development, international technology transfer, training and evaluation of reports. A centre can hire contract relevant experts in various fields from universities, institutions, companies who can assist in solving various technological problems.

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Where as there are various constraints in technological transfer for developing countries, recommendations have been made in order to make technology transfer successful by way of lessons learned from other developed and rapidly developing countries.

1.0 INTRODUCTION

Technology is the master key of development. There is no way a country is going to develop without generating, coordinating and transferring of technologies from other developed countries while setting as a goal the domestic development of new technology. Japan for instance has followed the course of building a modern nation by introducing a vast number of different technologies from Europe and the United States, and has further developed them through assimilation and absorption. Japan now offers numerous examples of international transfer of technology.

In order to achieve that, any country should have **Transfer Centres** of technologies. The main objective of any technology transfer centre is that of promoting the transfer of technology from the technology developers to technology users by way of consultancy, research, development, training and publication.

Unlike developed countries, Tanzania has very few technology transfer centres namely the Centre for Development and Transfer of Technology (CDTT) and the Tanzania Technology Transfer Centre (T^2), which are all public institutions.
There are about 97 centres doing research and developments in different technologies but not as transfer centres of technologies.

In Germany, for example, most centres, which are doing research and development, are also transfer centres. For instance, the Steinbeis Foundation, which is a private organisation alone, has 370 transfer centres in Germany and 87 transfer centres outside Germany (Johann, 1999).

Establishment and consequent organisation of an effective technology transfer centre might not be quite an easy task. It might be as difficult as to successfully introduce a new technology. It requires a careful planning and a lot of investment or resources in terms of equipment and personnel.

The main objective of this paper is to discuss the establishment and organisation, particularly the meaning of technology transfer, aim and role and who are the facilitators or key players of technology transfer. Requirements of establishing any technology transfer centre will be discussed; experiences and constraints of technology transfer centres, the Centre for Development and Transfer of Technology of the Tanzania Commission for Science and Technology taken as a case study.

2.0 TANZANIA POLICY ISSUES OF S&T

The 1985 National S&T Policy for Tanzania aimed at reflecting the key role that science and technology should play in bringing about socio–economic development and subsequent realization of self-reliance.

The importance of science and technology was expressed through the policy statements (URT, 1996). One of the statements was that, an effective National Body should be established. It should have the explicit responsibility for coordinating scientific and technological plans. Another responsibility should be the formulation of overall science and technology policies to stimulate activities for the promotion, monitoring, popularisation, assessment and advancement of science and technology in accordance with strategic criteria defined at political levels to mobilise scientific resources and local technological capabilities.

The establishment of the Commission for Science and Technology and the Centre for Development and Transfer of Technology was a result of the policy statement.

The policy also stated that adequate funds should be allocated for scientific research and technology development. It was proposed that a target of about 3.5% of GDP should be used for R&D activities by year 2000. However, this was not implemented.

In 1995 a need for a review of the 1985 S&T Policy was evident due to socio-economic factors for development in the country. The 1985 policy was devised based on state ownership of the means of production.

Policy changes towards opening up of the economy were instituted in the late 1980s. As such, the various sectors of the economy, re- oriented their policies and strategies to accommodate the new micro-economic policy direction. The final draft was approved by the cabinet in late 1995 and released to the public in April 1996.

The main features of the revised policy included among other things a realistic and implementable proposal for allocating 1% of GDP for R&D efforts.

However the revised policy has not been adopted fully because Tanzania is spending now 0.35% of the GDP.

3.0 THE CONCEPTS OF TECHNOLOGY TRANSFER

Technology can be defined as products, processes, or related findings that are tangible, reproducible and scientific or technical in nature. Technology can also be defined as “information required to produce and sell a product or service.” (Canon and Glazer, 1987).

Transfer is a flow of technology in a direction typically from the laboratory to the field. In the context of research and development of products, transfer implies manufacture and distribution.

Technology transfer aims at bringing technologies and methods developed into use by the people who need them. This means transferring useful products to manufacturers for commercialisation and availability for purchase by persons who use them.

A number of players are involved in Technology Transfer, including governmental and related organisations, academics such as universities and research institutes, large and small companies, and inventors and entrepreneurs.

Technology is often transferred informally through personal contacts, readings of the literature, and professional meetings. In the techno-system framework, these could be viewed as inputs to the training and R&D subsystems and hence as not immediately crucial in productive activities.

Technology transfer typically involves the following steps: discovery, evaluation acquisition, adaptation, and implementation (Cutler, 1991).

4.0 NECESSARY STEPS IN ESTABLISHMENT OF A NATIONAL TRANSFER CENTRE

Establishing a typical effective and functional technology transfer is an expensive project in terms of material, finance, manpower and time required. It can take to 7-12 or more years in order to establish a fully-fledged technology transfer centre [Diagram 1].

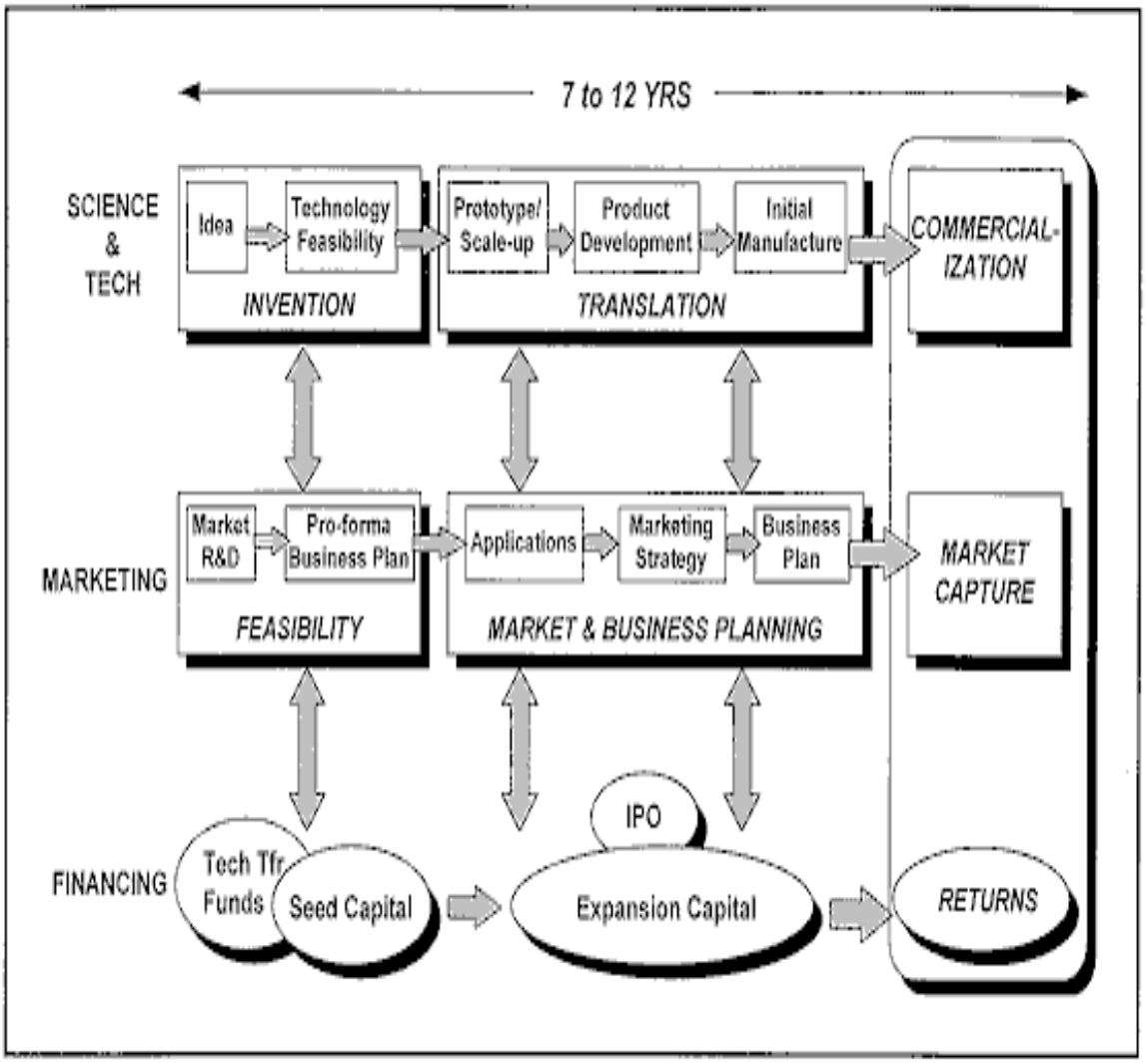

Diagram 1: Flowchart of Technology Transfer Steps

Below are some of the suggested steps in establishment of an effective Technology transfer centre:

- Understudy and prepare a proposal for the establishment of a system for the storage, handling and management of data on available technologies.
- Design the configurations and specify the hardware and software for the proposed centre.
- Installation and operationalization of the system.
- Proper start-up of information exchange activities with relevant national and international institutions/organisations such as UNIDO.
- Recruitment of a Project Co-ordinator.
- Recruitment of professional staff who will be trained to subsequently be part of the national system.

- Administrative support and facilities required such as:-
  - Secretary
  - Driver
    - Office space
    - Local transportation for experts and other staff
    - Office equipment and office supplies such as computers, tables, chairs etc.

5.0 THE CENTRE FOR DEVELOPMENT AND TRANSFER OF TECHNOLOGY (A Case Study of Tanzania)

5.1 Background information of Technology Transfer in Tanzania

A large part of technology development in Tanzania is based on the acquisition of foreign technology, in forms of both equipment, machinery as well as technical assistance projects based on the use of experts, training, ccnsultancy etc. There has been, however, no coherent government policy and institutional machinery in charge of co-ordinating and promoting technology acquisition, indigenization and monitoring. The technology transfer and development process in Tanzania has, therefore, been characterised by low degree of unpackaging of imported technologies resulting in slow absorption and assimilation.

In view of the above reasons, in 1989 the Government of Tanzania asked UNIDO to assist the Commission for Science and Technology in the establishment of a Centre for Development and Transfer of Technology.

The idea was to create an adequate national system for acquisition, indigenization and monitoring of technology, which could address the above problems. Additional functions are foreseen to be established within the Tanzania Commission for Science and Technology, which could expand its activities to include co-ordinative roles, advisory and information functions and the capability to promote the acquisition and the process of indigenization of imported technologies.

The idea was accepted and as a result steps for establishment of a national centre to be known as the **" Centre for Development and Transfer of Technology (CDTT)"** began.

5.2 History of CDTT Establishment

The idea of establishing a Centre for Development and Transfer of Technology started in the mid 1980's and in 1986 the Commission was empowered by the Parliament through Act No.7 as the same year to establish a national centre.

The Commission requested UNIDO to assist in setting up the Centre because UNIDO have long-standing experience in assisting developing countries in building up or strengthening their institutional and administrative infrastructures with regard to technology acquisition, evaluation, promotion and indigenisation.

In a positive response UNIDO filed a mission of two experts to Tanzania to help in the initiation of the Project. The Project commenced on 1st July1991 and funds were solicited and granted by UNDP for a two-year project The Commission was nominated as the Project Implementing Agency and an International Project Co-ordinator and a National Expert on Technology Management and Development were appointed by UNIDO.

In November 1992 the Commission approved the transformation of the then Directorate of Technology Development and Policy (DTDP) to a fully fledged Centre (CDTT) and henceforth empowered the Centre to perform all the existing functions of DTDP over and above the added functions of foreign technology transfer arrangements (acquisition, internationalisation and monitoring) as spelt out in the Act No.7 of 1986.

UNDP supplied funds for purchase of the following equipment for running the Centre:

- Equipment for Industrial and Technological Information System received in March 1994.
- Standby Generator.
- Two motor vehicles.

The UNDP support ended on 30th June 1994.

5.3 The Role of the CDTT

According to Part IV of the Parliamentary Act No.7 of 1986 that established the Tanzania Commission for Science and Technology, the Centre for development and Transfer of Technology shall have the following functions:

- The Centre shall be the principal organ of the Commission responsible for matters relating to the transfer, adaptation and development of technology including the assessment and choice of imported technology.
- To identify, within framework of national, social, economic and political constraints technological need for utilization in the different sectors of the economy.
- . To acquire and analyse information on alternative sources of technology and its delivery to users.
- To make an evaluation and selection of technologies with a view of developing a capacity of decision making in the area of science and technology.
- To play a major role in the unpackaging of imported technology including the assessment of the suitability of the technology as well as the direct costs of importing technology or development of such technology.
- To assist institutions importing technology in the negotiation of contracts for the supply of technology with the view of securing favourable terms under which technology may be supplied.
- To maintain a registry of imported technology and register of domestic technological resources and manpower.
- To act as a catalyst for the development of indigenous technology.
- To provide training for technical personnel in various fields of analysis of transfer of technology.
- To register all technology transfer agreements.

- To prepare plans for development of technology in the critical sectors of the economy.
- To monitor on a continuous basis the execution of any contract or agreement registered pursuant to this section.

It should however be noted that the Commission of Science and Technology of which the Centre is part, is not mandated to conduct research and development, but rather services an apex body of all other Research and Development institutions in the country. It collaborates with all other national and internationa R&D institutions.

5.4 Centre Successes

According to its mandate, the Centre has successfully done the following activities

- Organised some trainings, seminars, workshops, etc for technical personnel in various fields of analysis of transfer of technology.
- To a certain extent established a register of domestic technological resources.
- Has acted as a catalyst for the development of indigenous technology.

5.5 Problems Encountered

Since its inception in 1993, though mandated to do so, the Centre has not been able to successfully achieve the following:

1. Assessment and choice of imported technology for the country.

   One of the main functions of the centre was to advice the government on the choice of imported technology. This has however not been done by the centre following the trade liberalization whereby everyone is allowed to import technology in a free market economy. As a result outdated and obsolete technology has continuously been imported without any control. For example one can find in Tanzania every type of computer hardware, all types of motor vehicles some of very high fuel consumption and without spare parts.
2. The centre has not maintained a registry of imported technology. As a result it is not possible to name various types of technologies imported especially after trade liberalisation policies of the 1980s.
3. The centre has not actively taken part in the registration of all technology transfer agreements within the country.

6.0 CONCLUSIONS AND RECOMMENDATIONS

In order for the country to have technology transfer centres established and organized successfully throughout the whole country the following requirements need to be considered to:

1. Clear and coherent policy governing Technology Transfer is needed in the changing environment.
2. The existing R&D centres in the country could be strengthened to effectively assume the role of technology transfer centres COSTECH as an apex body should

continue to assist their coordination through CDTT as it is in other developed and developing countries such Germany and India.

3. The Centres, being the core and sources of all technologies, should fully and actively participate in all technological issues such as assessment and choice of all imported technologies within their areas of expertise, by way of collaborating with other institutions, which deal with technological agreements such as the TIC, PSRC and the Patent Office.
4. The Centres should be given the mandate to operate on commercial basis through research, development, registration and patenting their technologies rather than working as service providing centres only. This would need to revisit their Acts or articles of Association establishing them.
5. The Centres should have the Databases for appropriate types of technologies, local and imported. This will enable individuals to have access to various types of useful technologies.

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